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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict jcb performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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# TECHNICAL REPORT

# ON

# STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

# FOR

# DIRECTOR, SCHOOL LUNCH PROGRAM 0-71.32

# B-477 or S-204

TM 001 212

U. S. Employment Service in
Cooperation with
Mississippi State Employment Service

November 1962

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# STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

# FOR

# DIRECTOR, SCHOOL LUNCH PROGRAM 0-71.32

# B-477 or S-204

## Summary

The General Aptitude Test Battery, B-1002A, was administered to a final sample of 87 women employed as Director, School Lunch Program 0-71.32 in 87 different schools of the public school system in Mississippi. The criterion consisted of supervisory ratings on a descriptive rating scale. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes G - Intelligence, V - Verbal Aptitude, and Q - Clerical Perception were selected for inclusion in the test norms.

## GATB Norms for Director, School Lunch Program 0-71.32

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Director, School Lunch Program 0-71.32.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for
Director, School Lunch Program 0-71.32

| B-1001 | | | B-1002 | | |
|---|---|---|---|---|---|
| Aptitude | Tests | Minimum Acceptable Aptitude Score | Aptitude | Tests | Minimum Acceptable Aptitude Score |
| G | CB-1-H<br>CB-1-I<br>CB-1-J | 85 | G | Part 3<br>Part 4<br>Part 6 | 80 |
| V | CB-1-J | 80 | V | Part 4 | 80 |
| Q | CB-1-B | 75 | Q | Part 1 | 80 |

Effectiveness of Norms

The data in Table V indicate that 18 of the 28 poor workers, or 64 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 64 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 48 of the 58 workers who made qualifying test scores, or 83 percent, were good workers.

## I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Director, School Lunch Program 0-71.32.

## II. Sample

The General Aptitude Test Battery, B-1002A, was administered during the period June 21, 1960 to June 29, 1960 to a sample of 102 women employed as Director, School Lunch Program 0-71.32. Fifty-three workers were tested at the University of Mississippi, University, Mississippi; and forty-nine workers were tested at Mississippi Southern College, Hattiesburg, Mississippi. All persons tested were attending a summer institute for School Lunch Directors or Managers, sponsored by the State Department of Education. Of the 102 women tested, 15 were eliminated from the final sample; nine persons did not understand the instructions, one person was unable to perform satisfactorily on parts 8-12 of the GATB because of arthritis, five persons because of inadequate criterion data. Therefore, the final sample consisted of eighty seven women.

Requirements for the Director, School Lunch Program vary from school to school but there are no formal requirements with respect to age, education or experience. A period of two years (school years) experience on the job is believed necessary before a Director, School Lunch Program can be considered fully qualified. All workers in the sample have at least two school years of experience (18 months), and no one has less than a sixth grade education. Tests are used in the selection of workers for employment.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations ($\sigma$), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

Director, School Lunch Program 0-71.32

N = 87

| | M | $\sigma$ | Range | r |
|---|---|---|---|---|
| Age (years) | 49.2 | 8.2 | 32 - 65 | -.223* |
| Education (years) | 11.1 | 1.7 | 6 - 15 | .096 |
| Experience (months) | 64.7 | 38.2 | 18 - 180 | -.140 |

*Significant at the .05 level

The negative correlation with the criterion for age is significant at the .05 level, but it is not very great in magnitude. This correlation with age indicates that perhaps some of the Program Supervisors were slightly biased in

favor of some of the younger workers, or, on the other hand, the younger workers may have tended to perform better on the job than the older workers. There are no significant correlations with the criterion for education or experience. The data in Table II indicate that the sample is suitable for test development purposes with respect to age, education, and experience.

## III. Job Description

Job Title: Director, School Lunch Program 0-71.32

Job Summary: Plans, directs, and supervises the activities involved in preparing and serving noon meals in a school lunch room. Plans menus in keeping with a type of lunch pattern and within the allotted food budget. Plans and organizes work for self and school lunch workers. Instructs workers as to the best methods and techniques to be employed, and supervises them in the performance of specific assignments. Inspects premises, utensils, and other equipment for cleanliness. Prepares a daily record of school lunch operations which includes expenditures for food, labor, and equipment. Also enters on the report the estimated value of donated goods and services, number of lunches served, income, donated foods received during the month from USDA, and other pertinent information. Orders food and supplies. Works with the Principal or Superintendent and Program Sponsor, teachers, and school children in promoting the school lunch program. May consult with the Program Supervisor on any and all questions pertaining to the operation of the school lunch program. May assist with actual food preparation if necessary and may assist on the serving line or in the dining area if needed. May assist teachers in maintaining order in the lunch room. May be responsible for the collection and disbursement of funds. May hire and discharge school lunch workers. May perform other duties assigned by the Program Supervisor such as planning and supervising the preparation of meals for a school banquet.

Work Performed:

Plans Menus: Plans menus in advance in keeping with Type A Lunch Pattern; has considerable latitude in selection of menus as long as nutritional balance is provided. Makes full use of donated foods and keeps within allotted food budget.

Purchases Food and Supplies: Keeps informed of the surplus commodities available by reading the "Newsletter," a monthly letter issued by the State Department of Education. Makes maximum use of food "Buying Guide" in purchasing food. Purchases groceries and supplies once each week from various salesmen who call at the lunch room. Purchases ice cream and milk daily. Purchases equipment as needed, subject to approval of the Program Supervisor. Checks in food and supplies purchased. Files one copy of each invoice received and sends a copy of such invoices to the Program Supervisor. Checks in food donated by the U. S. D. A. and keeps a record of the amount of such foods used during the month.

Supervises Workers Engaged in School Lunch Activities: Supervises workers in the preparation of and serving of food; advises workers as to quantity of food to prepare based on the number expected for the meal; assists, as needed, in the preparation of foods for cooking and in the actual cooking of such foods; usually prepares and cooks food when new recipes are used; assists, when needed;

in serving food to students. Also supervises workers in the washing of dishes, silverware, cooking utensils, and in the cleaning of equipment and premises.

Prepares Daily Record of Income and Expenditures: Keeps a daily record of expenditures for food, labor, equipment, and any other pertinent items; the number of lunches served to students and adults each day, the types of meals served, charge for such meals, and the amount of money collected during the day. Works with bookkeeper in the Program Supervisor's office in preparing monthly report to be submitted to the State Department of Education.

Performs Other Related Duties: Plans, supervises, and assists in preparation of special meals for banquets (football, band, etc.) and for other special occasions. Takes advantage of each opportunity to promote School Lunch Program. Employs and trains new workers, and discharges unsatisfactory workers.

## IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

## V. Criterion

The criterion for this study consisted of supervisory ratings based on the Descriptive Rating Scale developed by the Bureau of Employment Security, Form SP-21. Ratings and reratings were obtained from first-line and second-line supervisors. First-line supervisors, Principals or Superintendents of public schools, are identified as Program Supervisors. Second-line supervisors comprise the field supervisory staff of the School Lunch Program of the State Department of Education, and they are identified as Area Supervisors. Ratings from both the Program Supervisors and Area Supervisors were made during the period September 15, 1960 to January 11, 1961. The time interval between ratings and reratings was from two to four weeks.

Eighty-seven first ratings were obtained from Program Supervisors, whereas only sixty-two reratings were received. A correlation of .90 was obtained between the ratings and reratings for the sixty-two workers. The sums of the two sets of ratings for sixty-two workers were computed to obtain the most reliable set of ratings. (Scores on the first ratings for the remaining twenty-five individuals were doubled in order to obtain ratings comparable to the total ratings secured for the sixty-two workers. This appears to be justified because of the very high correlation (.90) obtained between the ratings and reratings made by Program Supervisors for the sixty-two individuals.)

Area Supervisors prepared ratings and reratings on ninety-two workers. A correlation of .93 was obtained between the first and second ratings for the ninety-two individuals. The sums of the two sets of ratings for each worker were computed to obtain the most reliable set of ratings.

The correlation between total ratings assigned by Program Supervisors and Area Supervisors was .53 for the final sample of eighty-seven workers. Since the correlation obtained was less than .60, the combination of the two sets of ratings was not believed to be warranted. Total ratings made by Program Supervisors

were chosen as the final criterion because of the closer job contact (daily) that Program Supervisors have with the Director of the School Lunch Program. Each Area Supervisor is responsible for providing supervision to the Directors of a large number of schools; and for this reason, they are usually unable to visit each Director more than two or three times during a school year. Thus, the Program Supervisors are in a better position to observe the Lunch Program Directors and evaluate their performance. The possible range of final criterion scores was 18 through 90. The actual range of scores was 48 - 90 with a mean score of 71.5 and a standard deviation of 10.1.

## VI. Statistical and Qualitative Analysis

### A. Statistical Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations ($\sigma$), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Director, School Lunch Program 0-71.32

N = 87

| Aptitudes | M | $\sigma$ | r |
|---|---|---|---|
| G - Intelligence | 90.7 | 14.3 | .367** |
| V - Verbal Aptitude | 93.0 | 14.2 | .353** |
| N - Numerical Aptitude | 87.4 | 15.1 | .337** |
| S - Spatial Aptitude | 89.7 | 15.6 | .221* |
| P - Form Perception | 81.8 | 18.4 | .350** |
| Q - Clerical Perception | 91.1 | 14.9 | .324** |
| K - Motor Coordination | 88.2 | 16.6 | .291** |
| F - Finger Dexterity | 82.5 | 20.3 | .233* |
| M - Manual Dexterity | 88.4 | 17.6 | .211* |

**Significant at the .01 level
*Significant at the .05 level

Aptitudes G, V, S and Q have the highest mean scores and aptitudes G, V and Q have relatively low standard deviations.

For a sample of 87 cases, correlations of .275 and .211 are significant at the .01 level and the .05 level of confidence, respectively. Aptitudes G, V, N, P, Q, and K correlate significantly with the criterion at the .01 level. Aptitudes S, F, and M correlate significantly with the criterion at the .05 level.

B. Qualitative Analysis:

The job analysis indicated that the following aptitudes measures by the GATB appear to be important for this occupation,

Intelligence (G) - required in planning, directing, and supervising operations of school lunch program; in understanding written and oral instructions from Program and Area Supervisors; in organizing work load for the most efficient use of labor; in planning menus in accordance with Type A schedules, using menu and diet reference materials; in purchasing food supplies, equipment, and materials.

Numerical Aptitude (N) - required in the preparation of daily and monthly reports; in calculating costs of food, labor, supplies; in determining amounts of food to be prepared and served based on the number of lunches to be served and on the nutritional requirements.

Clerical Perception (Q) - required for accuracy in record keeping and in the preparation of daily and monthly reports; in checking invoices for purchases of food, equipment, and supplies; in checking diet requirements.

On the basis of the job analysis data, the following aptitudes are considered obviously unimportant for performing the duties of this job and are considered "irrelevant" aptitudes: S - Spatial, F - Finger Dexterity, and M - Manual Dexterity.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

| Type of Evidence | Aptitudes | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | G | V | N | S | P | Q | K | F | M |
| Job Analysis Data Important | X | | X | | | X | | | |
| Irrelevant | | | | X | | | | X | X |
| Relatively High Mean | X | X | | X | | X | | | |
| Relatively Low Sigma | X | X | | | | X | | | |
| Significant Correlation with Criterion | X | X | X | X | X | X | X | X | X |
| Aptitudes to be considered for trial norms | G | V | N | | P | Q | K | | |

Further consideration was given to Aptitudes G, V, N, P, Q, and K for inclusion in trial norms. Subsequently, Aptitude P was eliminated from further consideration because it failed to discriminate as efficiently as other aptitudes between workers in the high and low criterion groups. Trial norms consisting of various combinations of Aptitudes G, V, N, Q, and K with

appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that two sets of B-1002 norms, each with the same ratio of the obtained tetrachoric correlation coefficient to its standard error, showed better selective efficiency than any of the other test norms that were tried. One set of test norms, which consisted of G-80, V-85, and Q-80, screened out 39 per cent of the sample. The other set of test norms, which consisted of G-80, V-80, and Q-80, screened out 33 per cent of the sample. Since 32 per cent of the sample is in the low criterion group, norms consisting of G-80, V-80, and Q-80 were selected as the final test norms because they screened out a proportion of the sample that is closest to the proportion in the low criterion group.

## VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test, the criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A combined rating scale score (sum of Program Supervisors' Ratings Nos. 1 and 2) of 68 was used as the criterion critical score. This resulted in 28 of the 87 workers, or 32 per cent of the sample, being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes G, V, and Q with critical scores of 80, 80, and 80 respectively, and the dichotomized criterion for Director, School Lunch Program 0-71.32. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for Director, School Lunch Program 0-71.32

(G-80, V-80, Q-80)

N = 87

| | Non-Qualifying Test Scores | Qualifying Test Scores | Total |
|---|---|---|---|
| Good Workers | 11 | 48 | 59 |
| Poor Workers | 18 | 10 | 28 |
| Total | 29 | 58 | 87 |

$r_{tet} = .68$ $\quad X^2 = 15.806$

$r_{tet} = .18$ $\quad P/2 < .0005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

## VIII. Conclusions

On the basis of the results of this study, Aptitudes G, V, and Q with minimum scores of 80, 80, and 80 respectively, have been established as B-1002 norms for the occupation of Director, School Lunch Program 0-71.32. The equivalent B-1001 norms consist of G-85, V-80, and Q-75.

## IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns (10/61). The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.